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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/707,405

12/11/2003

Haochuan Jiang

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ZIOLKOWSKI PATENT SOLUTIONS GROUP, SC (GEMS)

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EXAMINER

SONG, HOON K

ART UNIT

PAPER NUMBER

2882

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

12/19/2006

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

Application No.

10/707,405

Applicant(s)

JIANG ET AL.

Examiner

Hoon Song

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 13 November 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,3,4,13-15,17-22 and 24-52 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 15,17-21,43,44 and 49-52 is/are allowed.
- 6) ☒ Claim(s) 1,3,4,13,14,22,24-28,34-37,41 and 42 is/are rejected.
- 7) ☒ Claim(s) 29-33,38-40 and 45-48 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Response to Amendment***

Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

### ***Drawings***

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "a reflective layer coated to a top face of the scintillator array" as claimed in independent claim 1 must be shown or the feature(s) canceled from the claim(s). A reflective layer 91 is trenched so that only portion of the reflective layers 88 are left on the final product.

No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New

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Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 3, 4, 13-14, 22, 24-28, 34, 36-37 and 41-42 are rejected under 35

U.S.C. 102(e) as being anticipated by Tsunota et al. (US 2003/0178570A1).

Regarding claim 1, Tsunota teaches a CT detector comprising:

a scintillator array having a plurality of scintillators (130) and

a reflector (540) interstitially disposed between at least two adjacent scintillators,

the reflector including a light absorption element (550) disposed between a pair of reflective elements and

a reflective layer (540) coated to a top of the scintillator array.

Regarding claim 3, Tsunota teaches the light absorption element is configured to reduce optical cross-talk between the at least two adjacent scintillators (paragraph 5).

Regarding claim 4, Tsunota teaches the light absorption element is configured to substantially eliminate optical cross-talk between the at least two adjacent scintillators (paragraph 6).

Regarding claim 13, Tsunota teaches the detector incorporated into a CT imaging system (paragraph 2).

Regarding claim 14, Tsunota teaches the CT imaging system is configured to acquire radiographic data of a medical patient (paragraph 2).

Regarding claim 22, Tsunota teaches a method of CT detector manufacturing comprising the steps of:

providing a scintillator array (130) of a plurality of scintillators, wherein the step of providing a scintillator array includes the step of forming a substrate of scintillation material;

disposing a reflective layer (540) between adjacent scintillators;

disposing a reflective layer (540) directly on an x-ray receptor surface of the scintillator array (130); and

disposing a light absorbing composite layer (550) between the reflective layers that are disposed between adjacent scintillators.

Regarding claim 24, Tsunota teaches pixelating the substrate (figure 7).

Regarding claim 25, Tsunota teaches the step of pixelating includes at least one of chemically and mechanically forming gaps in the substrate to define a plurality of scintillators (figure 7).

Regarding claim 26, Tsunota teaches mechanically forming gaps includes dicing the substrate (figure 7).

Regarding claim 27, Tsunota teaches depositing reflective material into at least the gaps (figure 7).

Regarding claim 28, Tsunota teaches depositing includes the step of casting (figure 7).

Regarding claims 34, 36 and 37, Tsunota teaches a CT detector comprising:  
a scintillator array having a plurality of scintillators (130); and  
a reflector (540) interstitially disposed between at least two adjacent scintillators (130), the reflector including a light absorption element (550) disposed between a pair of reflective elements, wherein the light absorption element is configured to absorb x-rays, reduce x-ray punch through wherein, the light absorption element includes a high atomic number metal composite (paragraph 6)

Regarding claims 41 and 42, Tsunota teaches a CT detector comprising:  
A scintillator array having a plurality of scintillators (2);  
A reflector top coat cast on an x-ray receptor surface of each of the plurality of scintillators and

A reflector (4) interstitially disposed between at least two adjacent scintillators, the reflector including a light absorption element disposed between a pair of reflective elements, wherein the pair of reflective elements includes  $\text{TiO}_2$  (paragraph 7).

***Claim Rejections - 35 USC § 103***



The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsunota.

Regarding claim 35, Tsunota teaches the claimed invention except for the light absorption element is configured to absorb approximately 50% of the x-ray. It would have been obvious to one having ordinary skill in the art at the time the invention was made to configure to absorb 50% of x-ray, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. Accordingly, one having ordinary skill in the art would be motivated to adapt the claimed absorption since it would further improve the cross-talk between the scintillator pixels.

#### ***Allowable Subject Matter***

Claims 15, 17-21, 43-44, 49-52 are allowed.

Claims 29-33, 45-48 and 38-40 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claims 15, 17-21 and 49-52, the prior art fails to teach each reflector assembly includes a composite layer sandwiched between at least a pair of reflective

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layer and the composite layer includes a high-Z metal and a low-viscosity polymer as claimed in claim 15.

Regarding claims 29-33, the prior art fails to teach disposing a composite layer in the reflective layer includes the step of creating channels in the reflective material as claimed in claim 29

Regarding claims 38-39, the prior art fails to teach the metal composite includes a cured metal powder and low viscosity polymer combination as claimed in claim 38.

Regarding claim 40, the prior art fails to teach the metal composite includes at least one of tungsten, tantalum and a metal powder with density greater than  $16 \text{ g/cm}^2$ .

Regarding claim 43, the prior art fails to teach each reflector assembly includes a first layer includes a first layer comprising a high atomic number metal and a low viscosity polymer, the first layer sandwiched between at least a pair of reflective layer and each reflective layer has a lateral thickness of approximately  $15\text{-}90\mu\text{m}$  and the composite layer has a lateral thickness of approximately  $50\text{-}100 \mu\text{m}$  as claimed in claim 43.

Regarding claim 44, the prior art fails to teach the first layer including a low viscosity polymer comprising one of epoxy and polyurethane and the reflector assembly is cast between adjacent scintillators as claimed in claim 44.

Regarding claim 45-48, the prior art fails to teach the reflector interstitially disposed between at least two adjacent scintillators is a composite comprising a high atomic number metal and a low viscosity polymer as claimed in claim 45

### ***Response to Arguments***




Applicant's arguments with respect to claims 1, 3, 4, 13-14, 22, 24-28, 34, 35-37 and 41-42 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hoon Song whose telephone number is (571) 272-2494. The examiner can normally be reached on 9:30 AM - 7 PM, Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Glick can be reached on (571) 272 - 2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



HKS